2.4.1 $N=8$, $m=3$

$8\overline{)3} = 0 \quad r=3,\ q=0$

$N/2 = 4$, $r < N/2 \therefore j$ DNE

$q=0,\ r=3,\ j$ DNE

2.4.4 $N=16$, $m=11$

$q=0,\ r=11,\ j$ DNE

$16\overline{)11} = 0 \quad r=11,\ q=0,\ j$ DNE

2.4.23 $f(t) = \sin(2\pi \cdot 20 \cdot t)$, $g(t) = \sin(2\pi \cdot 4 \cdot t)$; $N=16$

a.) f_{Ny}? index?

$N=16,\ T=1$

$f_{Ny} = \frac{16}{2(1)} = 8$

$\text{index} = N/2$

$N/2 = 16/2 = 8$

$f_{Ny} = 8$

$N/2 = 8$

b.) $16\overline{)20} = 1 \quad r=4$

$q=1 \quad m=20$

$r=4$

$$\sin\left(\frac{2\pi \cdot 20}{1} t_k\right) = \sin\left(\frac{2\pi \cdot 4}{1} t_k\right)$$

$\sin(2\pi \cdot 20 \cdot t_k) = \sin(2\pi \cdot 4 \cdot t_k) \Rightarrow \sin(2\pi \cdot 20 \cdot t) = \sin(2\pi \cdot 4 \cdot t)$

2.4.2 $\sin(2\pi \cdot 6 \cdot t)$ $N=8$ $N_F=4$

$m=6 \quad q=0 \quad r=6 \quad j=2$

$j = N - r \ :\ j=2$

$6 = \cancel{Q}(8) + r$

$r > N_F$

$r=6$

$\sin(2\pi \cdot 6 \cdot t) \downarrow -\sin(2\pi \cdot 2 \cdot t)$

2.4.3 $\sin(2\pi \cdot 7 \cdot t)$ $N=16$ $N_F=8$

$m=7 \quad q=0 \quad r=7$

$7 = Q(16) + r$

$7 = r$

$\sin(2\pi \cdot 7 \cdot t) \downarrow \sin(2\pi \cdot 7 \cdot t)$

2.4.5) $\sin(2\pi \cdot 35 \cdot t)$ $N=32$ $N_f=16$

$m=35$ $q=1$ $r=3$

$35 = \underline{1}(32)+r$

$3=r$

$\sin(2\pi \cdot 35 \cdot t) \downarrow \sin(2\pi \cdot 3 \cdot t)$

2.4.6) $\sin(2\pi \cdot 16 \cdot t)$ $N=32$ $N_f=16$

$m=16$ $q=0$ $r=16$

$16 = \underline{0}(32)+r$

$r=16$, $r=N_f$ $\therefore$

$\sin(2\pi \cdot 16 \cdot t) \downarrow 0$

2.4.7) $\sin(2\pi \cdot 40 \cdot t)$ $N=64$ $N_f=32$

$m=40$ $q=0$ $r=40$ $j=24$

$40 = \underline{0}(64)+r$

$40=r$ $r>N_f$ $\therefore$ $j=64-40=24$

$\sin(2\pi \cdot 40 \cdot t) \downarrow -\sin(2\pi \cdot 24 \cdot t)$

2.4.8) $\sin(2\pi \cdot 128 \cdot t)$ $N=64$ $N_f=32$

$128 = \underline{2}(64)+r$

$r=0$

$\sin(2\pi \cdot 128 \cdot t) \downarrow 0$